

**\* NOTICES \***

JPO and INPIT are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

**DETAILED DESCRIPTION**

---

**[Detailed Description of the Invention]****[0001]**

[Field of the Invention]This invention relates to the mold goods which consist of a polyamide composition which consists of semi aromatic polyamide and an inorganic bulking agent which has specific mean particle diameter, and it. If the polyamide composition of this invention is used, it will excel in the heat resistance at the time of moisture absorption, dimensional stability, and surface smoothness, and mold goods beautiful in surface appearance will be obtained.

**[0002]**

[Description of the Prior Art]Although the crystalline polyamide represented by nylon 6, Nylon 66, etc. from the former is widely used from the ease of the outstanding characteristic and melt molding as the object for garments, the textiles for industrial materials, or general-purpose engineering plastics, On the other hand, every problem with poor dimensional stability by the shortage of heat-resistant and water absorption is pointed out. Especially, in the electric electronic component field, the demand to the formation of small highly efficient is high, and a more advanced demand has come to be made to production technology or material in recent years. For example, osmosis of what is called a surface mount technology possible [ of high density assembly ] is remarkable as a mounting method of the electronic parts to a substrate, and the material which was excellent in reflow solder heat resistance, surface smoothness, and dimensional stability in connection with it came to be required.

[0003]Various polyamide compositions using semi aromatic polyamide are proposed to the demand of such a world. For example, to JP,59-53536,A, it is indicated that the polyamide composition which blends with semi aromatic polyamide the powder filler whose mean particle diameter is 0.1mmum-200micrometer is excellent in heat resistance, a mechanical property, chemical property, and a moldability.

[0004]

[Problem(s) to be Solved by the Invention]However, in using the powder filler whose mean particle diameter which is concretely indicated in the example of JP,59-53536,A is about 20-35 micrometers according to this invention persons' research. It was checked that the advanced demand of the world of satisfying the heat resistance at the time of moisture absorption, dimensional stability, and all the surface smoothness cannot be satisfied.

[0005]The purpose of this invention is excellent in the heat resistance at the time of moisture absorption, dimensional stability, and surface smoothness, and there is surface appearance in providing the mold goods which consist of the polyamide composition and it which give beautiful mold goods.

[0006]

[Means for Solving the Problem]This invention persons receive semi aromatic polyamide, as a result of inquiring wholeheartedly, in order to solve the above-mentioned technical problem, It begins, when mean particle diameter blends an inorganic bulking agent of 2 micrometers or less, and it excels in heat resistance at the time of moisture absorption, dimensional stability, and surface smoothness, finds out that a polyamide composition in which surface appearance gives beautiful mold goods is obtained, and came to complete this invention.

[0007]namely, this invention -- a terephthalic acid unit -- 60-100-mol % -- with a dicarboxylic acid unit (a) to contain. an aliphatic series alkylene diamine unit of the carbon numbers 6-18 -- 60-100-mol % -- mean particle diameter is related with a polyamide composition which blends the inorganic bulking agent (B) 0.1 of 2 micrometers or less - 120 weight sections to polyamide (A) 100 weight section which consists of a diamine unit (b) to contain. This invention relates to mold goods which consist of this polyamide composition.

[0008]

[Embodiment of the Invention]Hereafter, this invention is explained concretely. as the dicarboxylic acid unit which constitutes the polyamide (A) used for this invention -- a terephthalic acid unit -- 60 - 100-mol % -- it is necessary to contain -- 70 - 100-mol % -- containing is preferred -- 90 - 100-mol % -- containing is still more preferred. When the content of a terephthalic acid unit is less than [ 60 mol % ], since various physical properties, such as the low water absorption property of the polyamide composition obtained and chemical resistance, fall, it is not desirable.

[0009]As other dicarboxylic acid units other than a terephthalic acid unit, Malonic acid, dimethylmalonic acid, succinic acid, glutaric acid, adipic acid, 2-methyladipic acid, trimethyl adipic acid, pimelic acid, 2,2-dimethylglutaric acid, Aliphatic-dicarboxylic-acid;1,3-cyclopentane dicarboxylic acid, such as 3,3-diethylsuccinic acid, azelaic acid, sebamic acid, and suberic acid, Alicyclic dicarboxylic acid, such as 1,4-cyclohexanedicarboxylic acid; Isophthalic acid, 2, 6-naphthalene dicarboxylic acid, 2, 7-naphthalene dicarboxylic acid, 1,4-naphthalene

dicarboxylic acid, 1,4-phenylene dioxy diacetate, 1,3-phenylenedioxy diacetate, diphenic acid, 4,4-oxydi benzoic acid, The unit derived from aromatic dicarboxylic acid, such as diphenylmethane 4,4-dicarboxylic acid, diphenylsulfone 4,4-dicarboxylic acid, and 4,4-biphenyl dicarboxylic acid, can be mentioned, and one sort or two sorts or more can be included among these. It is preferred to include the unit derived from aromatic dicarboxylic acid also in these.

The unit derived from polyvalent carboxylic acid, such as trimellitic acid, trimesic acid, and pyromellitic acid, can also be included within limits with melt molding possible in which.

[0010]As a diamine unit (b) which constitutes the polyamide (A) used for this invention, the aliphatic series alkylene diamine unit of the carbon numbers 6-18 -- 60-100-mol % -- it is necessary to contain -- 75-100-mol % -- containing is preferred -- 90-100-mol % -- containing is still more preferred. When the content of the aliphatic series alkylene diamine unit of the carbon numbers 6-18 is less than [ 60 mol % ], since the heat resistance at the time of moisture absorption of the polyamide composition obtained, dimensional stability, and surface smoothness fall, it is not desirable. As an aliphatic series alkylene diamine unit of these carbon numbers 6-18. For example, a 1,6-hexanediamine, 1,7-heptanediamine, 1,8-octanediamine, 1,9-nonanediamine, 1,10-Deccan diamine, Straight-chain-shape aliphatic series alkylene diamine; 1-butyl-1,2-ethanediamine, such as 1,11-undecanediamine and 1,12-dodecanediamine, 1,1-dimethyl- 1,4-butanediamine, 1-ethyl-1,4-butanediamine, 1,2-dimethyl-1,4-butanediamine, 1,3-dimethyl- 1,4-butanediamine, 1,4-dimethyl- 1,4-butanediamine, 2,3-dimethyl- 1,4-butanediamine, 2-methyl-1,5-pantanediamine, 3-methyl-1,5-pantanediamine, A 2,5-dimethyl- 1,6-hexanediamine, a 2,4-dimethyl- 1,6-hexanediamine, A 3,3-dimethyl- 1,6-hexanediamine, a 2,2-dimethyl- 1,6-hexanediamine, a 2,2,4-trimethyl 1,6-hexanediamine, a 2,4,4-trimethyl 1,6-hexanediamine, a 2,4-diethyl- 1,6-hexanediamine, 2,2-dimethyl- 1,7-heptanediamine, 2,3-dimethyl- 1,7-heptanediamine, 2,4-dimethyl- 1,7-heptanediamine, 2,5-dimethyl- 1,7-heptanediamine, 2-methyl-1,8-octanediamine, 3-methyl-1,8-octanediamine, 4-methyl-1,8-octanediamine, 1,3-dimethyl- 1,8-octanediamine, 1,4-dimethyl- 1,8-octanediamine, 2,4-dimethyl- 1,8-octanediamine, 3,4-dimethyl- 1,8-octanediamine, 4,5-dimethyl- 1,8-octanediamine, 2,2-dimethyl- 1,8-octanediamine, 3,3-dimethyl- 1,8-octanediamine, The unit derived from branched-chain aliphatic series alkylene diamine, such as 4,4-dimethyl- 1,8-octanediamine and 5-methyl-1,9-nonanediamine, etc. can be mentioned, and one sort or two sorts or more can be used among these.

[0011]In the above-mentioned aliphatic series alkylene diamine unit, The unit derived from a 1,6-hexanediamine, 1,8-octanediamine, 2-methyl-1,8-octanediamine, 1,9-nonanediamine, 1,10-Deccan diamine, 1,11-undecanediamine, 1,12-dodecanediamine, etc. is preferred. In particular, a 1,9-nonane diamine unit and/or a 2-methyl-1,8-octane diamine unit are the most preferred. In using together a 1,9-NONANN diamine unit and a 2-methyl-1,8-octane diamine unit, 1,9-NONANN diamine unit: As for the mole ratio of a 2-methyl-1,8-octane diamine unit, it

is preferred that it is 99:1-1:99, it is more preferred that it is 95:5-40:60, and it is still more preferred that it is 90:10-60:40. If the polyamide which contains a 1,9-nonane diamine unit and/or a 2-methyl-1,8-octane diamine unit at an above-mentioned rate is used, since the mold goods in which the heat resistance at the time of moisture absorption, dimensional stability, and surface smoothness were more excellent will be obtained, it is desirable.

[0012]It is desirable, not less than 10% of the end groups of the chain are [ not less than 40% of ] more preferred, and it is [ not less than 70% of ] still more desirable, and, as for the polyamide (A) used for this invention, is closed with end encapsulant. If an end closure rate uses not less than 10% of polyamide, since the polyamide composition in which fusion stability, hot water resistance, etc. were more excellent will be obtained, it is desirable.

[0013]The end closure rate of polyamide (A) can measure the number of the ends closed with the carboxyl group end, the amino group end, and end encapsulant which exist in polyamide, respectively, and can ask for it by the following formula (1). As for the number of each end groups, it is preferred to ask from the integral value of the characteristic signal corresponding to each end group by  $^1\text{H-NMR}$  in respect of accuracy and simplicity.

[0014]

End closure rate (%) =  $[(\text{A-B})/\text{A}] \times 100$  (1)

[A expresses a molecular-chain-terminals group total (this is usually equal the twice of the number of polyamide molecules) among a formula, and B expresses the total number of a carboxyl group end and an amino group end. ]

[0015]If it is a compound of the monofunctional nature which has an amino group of a polyamide end or a carboxyl group, and reactivity as end encapsulant, there will be no restriction in particular, but. A point to monocarboxylic acid or monoamines, such as reactivity and the stability of a closure end, are preferred, and points, such as an ease of handling, to monocarboxylic acid is more preferred. In addition, acid anhydrides, such as phthalic anhydride, a monoisocyanate, mono- acid halide, monoester, and monoalcohol can be used.

[0016]As monocarboxylic acid used as end encapsulant, If it has reactivity with an amino group, there will be no restriction in particular, but. For example, acetic acid, propionic acid, butanoic acid, a valeric acid, caproic acid, caprylic acid, Lauric acid, tridecylacid, myristic acid, pulmitic acid, stearic acid, Alicyclic monocarboxylic acid, such as aliphatic-monocarboxylic-acid; cyclohexane carboxylic acid, such as pivalate and isobutyric acid; Benzoic acid, Aromatic monocarboxylic acids, such as toluic acid, alpha-naphthalene carboxylic acid, beta-naphthalene carboxylic acid, methylnaphthalene carboxylic acid, and phenylacetic acid, or these arbitrary mixtures can be mentioned. Also in these, acetic acid from points, such as reactivity, the stability of a closure end, and a price, propionic acid, butanoic acid, a valeric acid, caproic acid, caprylic acid, lauric acid, tridecylacid, myristic acid, pulmitic acid, stearic acid, and especially benzoic acid are preferred.

[0017]As monoamine used as end encapsulant, If it has reactivity with a carboxyl group, there will be no restriction in particular, but. For example, methylamine, ethylamine, propylamine, a butylamine, Hexylamine, octyl amine, decyl amine, stearylamine, Aliphatic series monoamines, such as dimethylamine, diethylamine, dipropyl amine, and dibutyl amine; Cyclohexylamine, Alicyclic monoamines, such as dicyclohexylamine; aromatic monoamines, such as aniline, a toluidine, diphenylamine, and naphthylamine, or these arbitrary mixtures can be mentioned. Also in these, the butylamine from points, such as the stability of reactivity, a high boiling point, and a closure end and a price, hexylamine, octyl amine, decyl amine, stearylamine, cyclohexylamine, and especially aniline are preferred.

[0018]As for the polyamide (A) used for this invention, it is preferred that the limiting viscosity [ $\eta$ ] measured at 30 \*\* among concentrated sulfuric acid is 0.4 - 3.0 dl/g, it is more preferred that it is 0.6 - 2.0 dl/g, and it is still more preferred that it is 0.8 - 1.6 dl/g. If limiting viscosity [ $\eta$ ] uses the above-mentioned thing within the limits, since the polyamide composition excellent in kinetic property, heat resistance, etc. is obtained, it is desirable.

[0019]As for the inorganic bulking agent (B) used for this invention, it is preferred that mean particle diameter needs to be 2 micrometers or less, and it is 0.05-1.9 micrometers, and it is more preferred that it is 0.1-1.8 micrometers. By using the thing of the above [ mean particle diameter ] within the limits, mold goods excellent in surface smoothness, surface beauty, heat resistance, dimensional stability, and all the moldabilities are obtained.

[0020]As an inorganic bulking agent (B) used for this invention, for example, calcium carbonate, silica, and aluminum silicate (kaolin.) clay, pyrophyllite, bentonite, and a magnesium silicate (talc.) Attapulgite, a calcium silicate (xonotlite, straw SUTONAITO), Magnesium oxide, magnesium hydroxide, magnesium carbonate, a hydrotalcite, Alumina, a sericite, mica, boric acid aluminum, potassium titanate, Titanium oxide, calcium sulfate, barium sulfate, magnesium sulfate, a zinc oxide, barium carbonate, boron nitride, molybdenum disulfide, etc. can be mentioned, and one sort or two sorts or more can be used among these. Also in these, calcium carbonate from viewpoints of the ease of carrying out of industrial acquisition, a price, the ease of dealing with it, etc., kaolin, clay, pyrophyllite, talc, silica, etc. are preferred. As shape of these inorganic bulking agents, although amorphous and a needle and tabular any may be sufficient, if a formless thing is used, mold goods with little anisotropy of dimensional stability will be obtained, and if a needlelike or tabular thing is used, mold goods with high intensity and elastic modulus will be obtained. The surface of an inorganic bulking agent (B) is the purpose of improving the dispersibility to the inside of polyamide, and it is preferred to be processed by the polymers or the low-molecular finishing agent of a silane coupling agent, a titanium coupling agent, and others.

[0021]As for the polyamide composition of this invention, it is preferred to contain the above-mentioned inorganic bulking agent (B) at a rate of 0.1 - 120 weight section, and to contain at a

rate of 0.5 - 110 weight section to above-mentioned polyamide (A) 100 weight section. The mold goods in which the content of the inorganic bulking agent (B) was excellent to polyamide (A) 100 weight section at heat resistance, dimensional stability, surface smoothness, and all the surface beauty in the case of less than 0.1 weight sections are not obtained. On the other hand, the moldability is inferior when the content of an inorganic bulking agent (B) exceeds 120 weight sections to polyamide (A) 100 weight section.

[0022]Organic bulking agents, such as the usual glass fiber, carbon fiber, liquid-crystal-resin textiles, an inorganic bulking agent with larger mean particle diameter than 2 micrometers, graphite, and polytetrafluoroethylene, etc. can be used for the polyamide composition of this invention within limits by which the effect of this invention is not spoiled if needed. If needed In addition, a polyphenylene sulfide, polyolefine, Other type polymer; colorant; ultraviolet ray absorbent; SadamuMitsuyasu-ized agents, such as polyester, aliphatic polyamide, polyphenylene oxide, and a liquid crystal polymer; A hindered phenol system, Fire retardant; nucleus agent; plasticizer; release agents, such as antioxidant; spray-for-preventing-static-electricity; bromination polymer, such as a thio system, the Lynn system, and an amine system, antimony oxide, and metal hydroxide; lubricant etc. can also be blended.

[0023]The polyamide composition of this invention can manufacture other ingredients by mixing by the desired method [ above / polyamide (A), inorganic bulking agent (B), and if needed ]. For example, a vertical mold or a level type mixer which is usually used for mixing of resin is used, After mixing other ingredients at a predetermined rate [ above / polyamide (A), inorganic bulking agent (B), and if needed ], it can manufacture by carrying out melt kneading using melt kneading machines, such as a single screw extruder, a twin screw extruder, a kneader, and a Banbury mixer. As the other methods, other ingredients may be blended, for example in the polymerization stage of polyamide (A) an inorganic bulking agent (B) and if needed.

[0024]When manufacturing mold goods using the polyamide composition of this invention, generally according to the kind of mold goods made into the purpose, a use, shape, etc., the various forming processes and molding equipments which are used to the thermoplastic resin composition can be used. For example, mold goods can be manufactured with arbitrary molding methods, such as injection molding, extrusion molding, press forming, blow molding, calender molding, and flow casting shaping. Mold goods can be manufactured, when cylinder temperature carries out melting of the polyamide composition of this invention within the cylinder of the injection molding machine adjusted to 280-340 \*\* and specifically introduces it in the metallic mold of predetermined shape (ejection). When cylinder temperature carries out melting of the polyamide composition within the extrusion machine adjusted to 280-340 \*\* and spins from a cap nozzle, a fibrous Plastic solid can be manufactured. When cylinder temperature carries out melting of the polyamide composition within the extrusion machine

adjusted to 280-340 \*\* and extrudes from a T die, a film and sheet shaped mold goods can be manufactured.

[0025]The mold goods obtained from the polyamide composition of this invention can also be used where the enveloping layer which consists of a paint, metal, other type polymer, etc. on the surface of mold goods is formed further.

[0026]The mold goods obtained from the polyamide composition of this invention, Excel in the heat resistance at the time of moisture absorption, dimensional stability, and surface smoothness, and since it is beautiful in surface appearance, For example, electronic parts, such as a connector, a switch, a relay, and a printed wired board, It can use for various uses, such as place-equipped-with-a-water-supply parts, such as autoparts, such as moving parts, such as reflectors, such as a lamp reflector, a gear, and a cam, and an air intake manifold, and a sink, various decoration components or a film, a sheet, and textiles.

[0027]

[Example]Although an example is given and this invention is explained concretely hereafter, this invention is not restricted at all by these. The following methods estimated the limiting viscosity in an example, the appearance of mold goods, unevenness on the surface of mold goods, solder-proof nature, and dimensional stability.

[0028]Limiting viscosity [eta] : Melt polyamide in concentrated sulfuric acid, prepare the sample solution whose concentration is 0.05 g/dl, 0.1 g/dl, 0.2 g/dl, and 0.4 g/dl, respectively, and the down flowing time (second) at 30 \*\* of each sample solution is measured, The intrinsic viscosity of each sample solution was computed from the following formula (2), and the value which extrapolated it to the concentration 0 was made into limiting viscosity [eta] (dl/g).

[0029]

$$\text{etanh} = (\text{dl/g}) [\ln(t_1/t_0)]/c \quad (2)$$

the inside of [type, and etanh -- the intrinsic viscosity (dl/g) of each sample solution --  $t_0$  expresses the down flowing time (second) of a solvent,  $t_1$  expresses the down flowing time (second) of the sample solution, and c expresses the concentration (g/dl) of the sample in a solution. ]

[0030]Appearance of mold goods: Mold goods with a 10 cm by 4 cmx thickness of 1 mm were produced by injection molding, and viewing estimated the appearance of mold goods.

[0031]Unevenness on the surface of mold goods: The center section of the piece of injection molding with a 10 cm by 4 cmx thickness of 1 mm was vertically fractured to the flow direction, and the maximum of unevenness on the surface of mold goods was measured by observing a section under a microscope.

[0032]Solder-proof nature (heat resistance at the time of moisture absorption) : the piece of injection molding with a 10 cm by 4 cmx thickness of 1 mm, After neglecting it in the

homioothermal constant humidity chamber of 80 \*\* and 90%RH for 24 hours, the appearance change at the time of making it immersed for 60 seconds during a 260 \*\* solder bath was observed visually, and the case where appearance change of "O", camber, bulging, etc. produced the case where appearance change does not arise was estimated as "x."

[0033]Dimensional stability: Heat shrinkage (flow direction) when the piece of injection molding with a 10 cm by 4 cmx thickness of 1 mm was heated at 160 \*\* for 4 hours was measured.

[0034]3256.1 g (19.60 mol) reference example 1 terephthalic acid, 2960.9 g (17.0 mol) 1,9-nonenediamine, 2-methyl-1,8-octanediamine 474.9 (3.0 mol), the benzoic acid 97.7g (0.80 mol), 6.8g (it is 0.1 % of the weight to a raw material) of sodium hypophosphite monohydrate, and 2.2 l. of distilled water were put into autoclave with a content volume of 20 l., and the

nitrogen purge was carried out. It stirred for 30 minutes at 100 \*\*, and temperature up of the internal temperature was carried out to 210 \*\* over 2 hours. At this time, pressure up of the autoclave was carried out to 22 kg/cm<sup>2</sup>. It was made to react, extracting a steam gradually and maintaining [ after continuing a reaction then for 1 hour, carry out temperature up to 230 \*\*, keep temperature at 230 \*\* after that for 2 hours, ] a pressure at 22 kg/cm<sup>2</sup>. Next, lowered the pressure to 10 kg/cm<sup>2</sup> over 30 minutes, and also it was made to react for 1 hour, and limiting viscosity [eta] obtained the prepolymer of 0.21 dl/g. Under 100 \*\* and decompression, it dried for 12 hours and this was ground to the size of 2 mm or less. Solid state polymerization of this was carried out under 230 \*\* and 0.1mmHg for 10 hours, and, in 308 \*\* and limiting viscosity [eta], the melting point obtained the white polyamide 1.04 dl/g and whose end closure rate are 90%.

[0035]Polyamide was obtained by manufacturing like the reference example 1 except using the reference example 2, 3 dicarboxylic acid components, a diamine component, and end encapsulant (benzoic acid) at a rate shown in the following table 1. The limiting viscosity [eta] of the obtained polyamide and an end closure rate are shown in the following table 1.

[0036]

[Table 1]

	ポリアミド用原料						ポリアミド	
	ジカルボン酸成分		ジアミン成分		末端封止剤		極限粘度 [ $\eta$ ] (dl/g)	末端封止率 (%)
	種類	仕込量 (mol)	種類	仕込量 (mol)	種類	仕込量 (mol)		
参考例1	TA	19.60	NMDA/MODA	17.0/3.0	BA	0.80	1.04	90
参考例2	TA	19.60	NMDA/MODA	17.0/3.0	BA	0.60	1.30	92
参考例3	TA	19.60	NMDA/MODA	14.0/8.0	BA	0.80	1.07	91

## [略号の内容]

TA : テレフタル酸

NMDA : 1,9-ノナンジアミン

MODA : 2-メチル-1,8-オクタンジアミン

BA : 安息香酸

[0037]The dry blend of the kaolin (mean particle diameter of 0.8 micrometer) of 67 weight sections was added and carried out to polyamide 100 weight section of the example 1 reference example 1. The Oriental energy machine factory twin screw extruder "lab PURASUTO mill 2D 25W" was used, and this was extruded according to the molten state with the cylinder temperature of 320 \*\*, and the revolving speed of 40 rpm, and it pelletized, after cooling a strand with a cooling water pool. After carrying out vacuum drying of this at 120 \*\* for 12 hours, the aforementioned method estimated the physical properties of the mold goods obtained by setting a cylinder temperature as 320 \*\*, setting a die temperature as 150 \*\*, and carrying out injection molding using the NISSEI PLASTIC INDUSTRIAL injection molding machine "NS15." An evaluation result is shown in the following table 2.

[0038]The polyamide composition was manufactured like Example 1 except having used the polyamide shown in Example 2 - Table 2 of 4 following, and an inorganic bulking agent at a rate shown in the following table 2. The aforementioned method estimated the physical properties of the mold goods produced by making it be the same as that of Example 1 using this polyamide composition. An evaluation result is shown in the following table 2.

[0039]The polyamide composition was manufactured like Example 1 except having used the polyamide shown in the comparative example 1 - Table 2 of 5 following, and an inorganic bulking agent at a rate shown in the following table 2. The aforementioned method estimated the physical properties of the mold goods produced by making it be the same as that of Example 1 using this polyamide composition. An evaluation result is shown in the following table 2.

[0040]

[Table 2]

ポリアミドの種類	実施例1		実施例2		実施例3		実施例4		比較例1		比較例2		比較例3		比較例4		比較例5	
	参考例1	参考例2	参考例1	参考例2	参考例3	参考例1	参考例1	参考例2	参考例1	参考例2	参考例1	参考例2	参考例3	参考例1	参考例2	参考例3	参考例4	参考例5
無機充填剤の種類	カオリン	硫酸カルシウム	タルク	チタン酸カリウム	—	カオリン	ガラス繊維	マイカ	ワラストナイト	—	—	—	—	—	—	—	—	—
平均粒径 ( $\mu\text{m}$ )	0.8	1.5	1.5	0.5	—	—	—	—	—	0.8	1.0	3.0	—	—	—	—	—	5
添加量 (重量部) <sup>1)</sup>	6.7	6.7	4.3	4.3	0	200	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
成形品の外観	光沢があり良好	光沢があり良好	光沢があり良好	光沢があり良好	光沢があり良好	光沢があり良好	光沢があり良好	光沢があり良好	光沢があり良好	表面が荒れています								
成形品表面の凹凸 ( $\mu\text{m}$ )	2.9	3.3	3.2	3.2	2.9	4.5	8.5	7.5	7.5	—	—	—	—	—	—	—	—	—
耐ハシ性	○	○	○	○	○	○	×	○	○	○	○	○	○	○	○	○	○	○
形状安定性 (%)	0.1	0.1	0.1	0.2	0.4	0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

1) ポリアミド100重量部に対する割合

[0041]

[Effect of the Invention] The mold goods obtained from the polyamide composition of this invention are excellent in the heat resistance at the time of moisture absorption, dimensional stability, and surface smoothness, and it is [mold goods] beautiful in surface appearance.

---

[Translation done.]